SPECIAL HAZARD SUPPRESSION SYSTEMS INFORMATION PACKET

Colorado Springs Fire Department

March 2012

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PURPOSE

This information packet has been developed in an effort to provide the highest level of service to the customers of the CSFD. The major goal plan reviews conducted by the CSFD is to ensure the design of fixed extinguishing systems meet the minimum requirements of the adopted codes and ordinances. To meet this goal, the submitted plans and supporting documentation must contain the information needed to conduct a thorough review.

SCOPE

This packet outlines the minimum requirements set forth in the International Fire Code, local amendments, and departmental policies and procedures as they relate to the installation of special hazard suppression systems. This packet is not intended to provide an all-inclusive listing of submittal and inspections requirements, as it would be virtually impossible to cover all situations. This packet only covers requirements set forth in the latest edition of applicable NFPA standards listed below. This packet does not cover wet chemical, foam, water spray or halon systems. Also included in this packet is information covering items required to be included on the working drawings and supporting documents.

DEFINITIONS

CSFD	Colorado Springs Fire Department
CO2	Carbon Dioxide
FACP	Fire Alarm Control Panel
Ft^2	Square feet
IFC	International Fire Code
NFPA	National Fire Protection Association
PSI	Pounds force per square inch
RBD	Regional Building Department

GUIDELINES

I. INTRODUCTION.

A. APPLICABLE CODES AND STANDARDS.

1. 2009 International Fire Code and its local Amendments.
2. 2011 Edition of NFPA 12 Carbon Dioxide Extinguishing Systems.
3. 2009 Edition of NFPA 17 Dry Chemical Extinguishing Systems.
4. 2012 Edition of NFPA 2001 Clean Agent Fire Extinguishing Systems.
5. Colorado Springs City Ordinances.

6. CSFD Administrative Rulings/Interpretations.

B. ADMINISTRATIVE REQUIREMENTS.

1. **Approved Contractors**. All contractors working on special hazard suppression systems must obtain a Fire Suppression Contractor B License in order to design, install, add to, alter, service, maintain, repair, test and inspect special hazard suppression systems, in accordance with Pikes Peak Regional Building Code, Section 207. Please contact Regional Building Department, Contractor Licensing at 719-327-2884 for additional information.

2. **NEW! Service Technicians.** A Colorado Springs licensed Service Technician shall be on-site for all installations, additions, alterations, repair and inspections of special hazard suppression systems. Service Technicians are required to pass a test and obtain approval from CSFD prior to overseeing any work on any special hazard suppression system. All Service Technicians must be registered by May 5th 2012!

3. **Code/Standard Editions**. Special hazard fire systems shall meet the criteria of the 2009 IFC as amended and all applicable requirements of the most recent edition of the NFPA standards. NFPA standards are effective on the January 1st of the year following the effective date printed in the standard.

4. **Permits/Inspections**. Required plan submittal with approvals, permits and associated inspections must be secured through CSFD Construction Services. Plan approval and permits shall be secured prior to the start of any work.

5. **Special Circumstances**. Depending upon the scope of work, different types of submittals may be required; therefore you may want to contact the CSFD Construction Services for any additional information.

6. **Alternative Methods**. If special building conditions and/or restrictions exist that may prohibit any of the requirements set forth in this packet from being met, approval by the Construction Services for an alternate installation will be required. This alternate method must be approved before any installation of the system begins.

7. **Additional Material and Information**. Product information and specifications (cut sheets and or applicable design manual pages) shall be provided for all equipment installed or added to an existing system.

8. **Revisions.** All revisions shall be clouded and identified with a sequential numbering or lettering system, such as Revision A, B, etc or Revision 1, 2, etc. Revisions are date sensitive, thus each revised sheet must bear the date of the revision.

II. SUBMITTAL INFORMATION.

This section of the packet provides information as to documentation, in addition to the shop drawings, that shall be provided at the time of plan submittal. This documentation is required to assure the plan submittal package contains the necessary information for a complete plan review.

A. MINIMUM REQUIREMENTS OF THE CSFD FOR SUBMITTAL.

1. **Drawings/Plans.** Drawings shall be submitted on sheets no less than 11 x 17 inches. Plans shall be scaled or suitably dimensioned and reproducible. Plans shall contain the following information and/or detail indicated in the checklist at the end of this packet.

2. **Plan Review Number**. Drawings shall be provided with **CSFD Plan Review Number**. This number is an eight digit numeric code located on the back of the Construction plans. Some plans are system work only so please indicate such and we will issue a plan review number.

3. **Number of Drawing Sets**. A minimum of 2 sets of drawings are required to be submitted to the CSFD and shall include the items found in the checklist provided with this packet. A maximum of three original sets may be stamped with our approval.

4. **Cut Sheets/Specifications**. A minimum of 1 set of manufacturer's product information shall be provided. This is to include information on all devices that are part of or being connected to, the fixed fire system; such as piping, valves, hangers, etc. Any cut sheets showing multiple models/type of devices, the specific item being installed shall be highlighted. As an example, there are several models of nozzles used, the specific nozzle protection shall be highlighted. Failure to do so may result in a disapproval. Please provide only those pages from the design manual that are applicable to the system. Stamped cut sheets will be returned to the contractor and must remain on the job site with the approved plans.

   CSFD accepts cut sheets on CD. If the option of providing cut sheets via CD is chosen, the CSFD will stamp, date and initial the CD – it is then the contractor's responsibility to provide the means of reviewing that disk upon the fire inspector's request. The CD must have the individual cut sheets for the materials specific to the job. Note: we will not accept manufacturer's CD's!

5. **Calculations**. A minimum of 2 sets of complete calculations (as necessary dependant on the type of system) are required to be submitted to the CSFD and shall include the items found in the checklist provided with this packet. One set will be retained by CSFD for our records.

6. **Code Study**. In some cases, CSFD will require a code study of the design criteria for the system being submitted. Each step is required to be detailed, reference each code or standard section used in arriving at the design criteria for the system.

7. **Submittal of Plans.** When submitting plans for special hazard systems, you may submit the suppression layout with the alarm/detection layout as one submittal to receive one permit. Or, you may submit them separately and receive separate permits. Each protected space is considered its own system and will be charged accordingly. Additionally, scopes of work must match between separated submittals. For example, if the suppression layout is submitted as 4 separate systems and 4 separate permits are to be issued, the alarm/detection portion must also be issued 4 separate permits.

III. GENERAL INFORMATION AND REQUIREMENTS.

A. MONITORING. Where a building fire alarm system is installed, special hazard systems shall be monitored by the building fire alarm system. .

Buildings provided with a dedicated function system (such as elevator recall) that is not already monitored, are not required to monitor special hazard suppression system.

The general rule of thumb is, if the building is provided with a monitored panel (other than burglar) the special hazard suppression system must also be monitored.

B. SEQUENCE OF OPERATIONS.

1. **Single-Zone v. Cross Zoned Systems.** Plans shall designate whether the system is a single or cross-zoned system. The building FACP will provide operational signals for the building horn/strobes. The releasing panel, if dedicated, shall provide the operations signals for the special hazard horn/strobes.

2. **Pre-Discharge Alarms.**
   a) Activation of any single detector in any detection zone shall initiate a first-stage alarm. Release panel sends a general alarm signal to the FACP.
   b) FACP operates horn/strobes throughout the facility including inside the protected space.
   c) A red strobe located outside the protected room shall indicate activation of the suppression system. This device shall be indicated as FIRE SUPPRESSION SYSTEM DISCHARGE. Releasing panel shall operate auxiliary contacts (such as HVAC interlocks).

Except in cases where the release panel is the main fire alarm control panel for the premises, all changes of state (alarm, trouble supervisory, etc.) in the releasing system shall be monitored by the building fire alarm control panel. Pre-discharge, valve supervisory switches and any other devices designated to report as a supervisory condition, i.e. duct detectors, shall report to the building FACP as Supervisory conditions. System discharge shall report to the building FACP as a general alarm/agent discharge.

A minimum of one horn/strobe operated by the building FACP shall be located within the protected space. The special hazard horn/strobes shall be activated by an alarm signal from the releasing panel. The special hazard horn/strobes shall be appropriately labeled signs identifying them to the specific type of system; FM-200, Inergen, etc. Signs shall be permanent with lettering at least 1-1/2 inches tall in contrasting color to the background.

Manufacturer's sequence requirements override these requirements.

IV. SPECIFIC SYSTEM INFORMATION.

A. DRY CHEMICAL EXTINGUISHING SYSTEMS.

1. Fuel and /or electrical power supply, shall be arranged to shut off all equipment or hazards, including but not limited to conveyors and flowing flammable or combustible

fluids or gases, protected by the extinguishing system when it is actuated. All shutoff systems shall require manual resetting. (NFPA 17:5.5)

2. Where two or more hazards can be simultaneously involved in fire by reason of proximity, the hazards shall be protected by either multiple systems installed to operate simultaneously or one system designed to protected all hazards that can be simultaneously involved. (NFPA 17:5.2-5.3)

3. Ventilation systems may or may not be required to shut down depending on the type of application (local application, total flooding, etc) and what you are protecting. Please contact the CSFD for additional information if you are not sure.

4. At least one manual pull station shall be provided for each system and shall be located in a path of egress (NFPA 17:5.7.1). Multiple pull stations shall be provided with signage as to what system they are connected to and/or what appliances/hazards they protect.

B. CARBON DIOXIDE EXTINGUISHING SYSTEMS.

1. Warning signs shall be provided in every protected space, entrances to protected spaces, anywhere CO2 may migrate, storage rooms containing CO2 system cylinders, at every manual pull station location, etc. (NFPA 12:4.3.2)

2. All system components shall be located so as to maintain minimum clearances from live electrical components per NFPA 12:4.3.4. Please note at altitudes above 3,300 feet, the clearances must be increased.

3. Abort switches are NOT allowed to be used with CO2 systems.

4. NEW! Audible and visible warning alarms, including pre-discharge alarms and time delays, shall be provided in accordance with NFPA 12:4.5.6.

C. CLEAN AGENT EXTINGUISHING SYSTEMS.

1. NEW! Initiating and releasing circuits shall be installed in raceways. (NFPA 2001:4.3.1.3)

2. Alarms or indicators shall be used to indicate the operation of the system, hazards to personnel, or failure of any supervised device. (NFPA 2001:4.3.5.1)

3. Audible and visual pre-discharge alarms shall be provided within the protection area to provide positive warning of impending discharge. Time delays associated with pre-discharge alarm shall be provided. The length of the delay shall be indicated within the sequence of operations. (NFPA 2001:4.3.5.2 and 4.3.5.6.1)

4. Abort switches shall be located within the protected area and shall be located near the means of egress for that area. Abort switches shall be of the “dead-man” type, requiring constant pressure. A telephone should be located near the abort switch. Manual pull station shall always override an abort switch. (NFPA 2001:4.3.5.3)

5. Warning signs shall be provided in every protected space, entrances to protected spaces, anywhere CO2 may migrate, storage rooms containing CO2 system cylinders, at every manual pull station location, etc (NFPA 2001:4.3.5.5).

V. INSTALLATION.

A. ADMINISTRATIVE PERMITS.

1. Work at Risk. Approval shall be obtained from CSFD to begin work prior to issuance of a permit. A letter is to be submitted to CSFD requesting the work at risk, and defining the justification for the request.

B. Construction Permits.

1. The installation of the extinguishing system is not to commence, including any pre-piping until the working plans have been reviewed and approved by CSFD and a permit secured on site, per IFC 105.1.4.

2. A construction permit is required for installation of or modification to a special hazard system. Maintenance is defined as the work necessary to keep equipment operable or to make repairs. An example of maintenance work would be replacement of he fusible links. Re-arrangement of piping for a new room layout would not require a permit, as long as the amount of agent or the number of tanks does not change.

3. Permits for fire extinguishing systems expire one year after date of issue. A 30-day grace period is allowed to renew the permit. After the grace period expires, if inspections have been conducted in the past 13 months, new plans and permit is not required to be submitted. If the grace period has expired and no inspections have occurred in the past 13 months, new plans shall be submitted. Refer to IFC 105.3.1 for further information.

C. NEW! Releasing Panels.

1. Dedicated releasing panels shall be located inside the protected space or within 10-feet of the main entry door to the protected space. The panel shall be visible and accessible at all times.

2. If a dedicated releasing panel is used, a sign shall be located adjacent to the FACP which identifies the location of the releasing panel.

3. If the dedicated releasing panel protects multiple rooms, a sign identifying the location of the releasing panel shall be provided within each room.

VI. INSPECTIONS AND TESTING.

Systems shall undergo an acceptance test witnessed by CSFD. It shall be the duty of the installing contractor to schedule the inspection with their assigned inspector (IFC 901.5). It shall

be unlawful to occupy any portion of a building or structure until the required systems have been tested and approved by the CSFD (IFC 901.5.1).

A. **VISUAL INSPECTION.** Piping shall be visually inspected to verify proper materials and installation methods. Nozzles shall be provided with caps to prevent debris or other foreign material from entering the piping system.

B. **SYSTEMS OPERATIONAL TESTS**. A puff test or a full discharge test will be required, depending on the specific type of system. Please check with CSFD for additional information.

REFERENCES AND LINKS

a. Colorado Division of Fire Safety Web site.
http://dfs.state.co.us

b. Administrative Rulings and IFC Amendments can be found on the CSFD web site at http://www.springsgov.com/SectionIndex.asp?SectionID=5.

ATTACHMENTS

Working Drawing Submittal Checklist

Hydraulic Calculations Checklist

Plan Requirements for Special Hazard Suppression Systems

Working Drawings

Title Block shall contain the following:

- ❑ Name of owner and occupant.
- ❑ Location including full street address as assigned by RBD Enumerations.
- ❑ Name, address, phone, FAX number and email address of installing contractor and designer.
- ❑ CSFD Plan Review number or other designator
- ❑ A scale including graphic representation OR suitably dimensioned.
- ❑ Detailed scope of work.

Information required on Drawings:

DRY CHEMICAL SUPPRESSION SYSTEMS

Building Information:

- ❑ Location and construction of protected enclosure walls and partitions.
- ❑ Enclosure cross section, full height or schematic diagram including location and construction of building floor/ceiling assemblies above and below, raised access floor and suspended ceiling.
- ❑ Building key plan if required

System Information:

- ❑ Agent being used and the amount provided.
- ❑ Description of occupancies and/or hazards being protected, designating whether or not the enclosure is normally occupied
- ❑ Description of exposures surrounding the enclosure or protected area
- ❑ Description of agent storage containers used including internal volume, storage pressure, and nominal capacity expressed in units of agent mass or volume at standard conditions of temperature and pressure
- ❑ Description of nozzles used including size, orifice port, configuration and equivalent orifice area and material
- ❑ Description of pipe and fittings used including material specifications, grade and pressure rating.
- ❑ Equipment schedule or bill of materials.
- ❑ Plan view of the protected area showing enclosure partitions; agent distribution system including agent storage containers, piping and nozzles, location of controlled devices such as dampers and shutters and location of instructional signage.

- ❑ Isometric view of agent distribution system showing the length and diameter of each pipe segment, fittings including reducers and strainers; and orientation of tees, nozzles including size, orifice port configuration.
- ❑ Details of each unique rigid pipe support configuration showing method of securement to the pipe and to the building structure.
- ❑ Details of the method of container securement showing method to the container and to the building structure.
- ❑ Details of any special features

CARBON DIOXIDE SUPPRESSION SYSTEMS

Building Information:

- ❑ Location and construction of protected enclosure walls and partitions.
- ❑ Enclosure cross section, full height or schematic diagram including location and construction of building floor/ceiling assemblies above and below, raised access floor and suspended ceiling.
- ❑ Building key plan if required, showing location of the hazards

System Information:

- ❑ Amount of CO2 provided to include calculations
- ❑ Description of occupancies, materials and/or hazards being protected, designating whether or not the enclosure is normally occupied
- ❑ Description of exposures surrounding the enclosure or protected area
- ❑ Description of agent storage containers used including internal volume, storage pressure, and nominal capacity expressed in units of agent mass or volume at standard conditions of temperature and pressure
- ❑ Description of nozzles used including size, orifice port, configuration and equivalent orifice area and material
- ❑ Location and flow rate of each nozzle, including equivalent orifice area
- ❑ Description of pipe and fittings used including material specifications, grade and pressure rating.
- ❑ Location, size and equivalent lengths of pipe, fittings and hose, pipe reduction methods and orientation of tees.
- ❑ Information pertaining to the location and function of the detection devices.
- ❑ Plan view of the protected area showing enclosure partitions; agent distribution system including agent storage containers, piping and nozzles, location of controlled devices such as dampers and shutters and location of instructional signage.
- ❑ Isometric view of agent distribution system showing the length and diameter of each pipe segment, fittings including reducers and strainers; and orientation of tees, nozzles including size, orifice port configuration.
- ❑ Details of the method of container securement showing method to the container and to the building structure.
- ❑ High or low pressure storage cylinders/systems

- ❑ Local Application or total flooding
- ❑ Flash/Surface fire or deep seated
- ❑ Location and function of detection devices
- ❑ Location of operating devices
- ❑ Auxiliary equipment if any
- ❑ Location of the hazards
- ❑ Enclosure or limits and isolation of the hazards
- ❑ Surrounding area that could affect the protected hazards
- ❑ Location and size of CO2 storage facility or area
- ❑ Length of time delay for pre-discharge alarms
- ❑ Details of any special features
- ❑ Equipment schedule or bill of materials

CLEAN AGENT SUPPRESSION SYSTEMS

Building Information:

- ❑ Location and construction of protected enclosure walls and partitions.
- ❑ Enclosure cross section, full height or schematic diagram including location and construction of building floor/ceiling assemblies above and below, raised access floor and suspended ceiling.
- ❑ Building key plan if required, showing location of the hazards

System Information:

- ❑ Agent being used and location
- ❑ Description of occupancies, materials and/or hazards being protected, designating whether or not the enclosure is normally occupied
- ❑ Description of exposures surrounding the enclosure or protected area
- ❑ Description of agent storage containers used including internal volume, storage pressure, and nominal capacity expressed in units of agent mass or volume at standard conditions of temperature and pressure
- ❑ Description of nozzles used including size, orifice port, configuration and equivalent orifice area and material
- ❑ Location and flow rate of each nozzle, including equivalent orifice area
- ❑ Description of pipe and fittings used including material specifications, grade and pressure rating.
- ❑ Location, size and equivalent lengths of pipe, fittings and hose, pipe reduction methods and orientation of tees.
- ❑ Information pertaining to the location and function of the detection devices.
- ❑ Plan view of the protected area showing enclosure partitions; agent distribution system including agent storage containers, piping and nozzles, location of controlled devices such as dampers and shutters and location of instructional signage.

- ❑ Isometric view of agent distribution system showing the length and diameter of each pipe segment, fittings including reducers and strainers; and orientation of tees, nozzles including size, orifice port configuration.
- ❑ Details of the method of container securement showing method to the container and to the building structure.
- ❑ High or low pressure storage cylinders/systems
- ❑ Local Application or total flooding
- ❑ Flash/Surface fire or deep seated
- ❑ Location and function of detection devices
- ❑ Extinguishing or inerting concentration
- ❑ Refer to Fire Alarms Information Packet for information on the Alarm and Detection portion of these systems.
- ❑ Calculations to include:
    - ❑ Enclosure volume
    - ❑ Quantity of agent
    - ❑ Container storage pressure
    - ❑ Internal volume of container
    - ❑ Location, type, flow rate of each nozzle including equivalent orifice area
    - ❑ Location, size and equivalent lengths of pipe, fittings and hose
    - ❑ Location and size of storage area/facility

- ❑ Location of operating devices
- ❑ Auxiliary equipment if any
- ❑ Location of the hazards
- ❑ Enclosure or limits and isolation of the hazards
- ❑ Surrounding area that could affect the protected hazards
- ❑ Location and size of CO2 storage facility or area
- ❑ Length of time delay for pre-discharge alarms
- ❑ Details of any special features
- ❑ Equipment schedule or bill of materials